

සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka
ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரīட்சைத் திணைக்களம் இலங்கைப் பரīட்சைத் திணைக்களம்

88 E I, II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2022(2023)
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2022(2023)
General Certificate of Education (Ord. Level) Examination, 2022(2023)

නිර්මාණකරණය හා ඉදිකිරීම් තාක්ෂණවේදය

I, II

வடிவமைப்பும் நிருமாணத் தொழினுட்பவியலும்

I, II

Design and Construction Technology

I, II

පැය තුනයි

மூன்று மணித்தியாலம்

Three hours

අමතර කියවීමේ කාලය - මිනිත්තු 10 යි
மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள்
Additional Reading Time - 10 minutes

Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.

Design and Construction Technology I

Instructions:

- * Answer all questions.
- * In each of the questions 1 to 40, pick one of the alternatives (1), (2), (3), (4) which is correct or most appropriate.
- * Mark a cross (X) on the number corresponding to your choice in the answer sheet provided.
- * Further instructions are given on the back of the answer sheet. Follow them carefully.

1. What is the standard line that is used to show hidden edges of a plan drawing?

- (1) _____
(2) _____
(3) _____
(4) _____

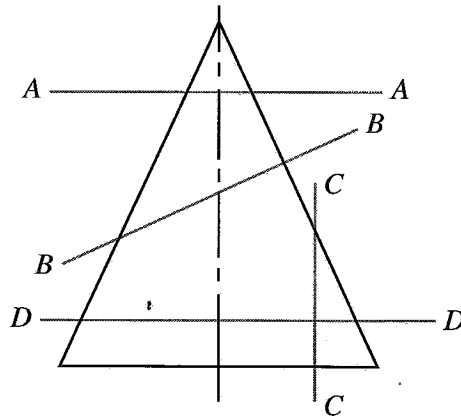
2. The number of tangent/tangents that can be drawn to a circle from an externally established point is/are

- (1) 1. (2) 2. (3) 4. (4) 360.

3. Select the **wrong** statement out of the following statements.

- (1) Value of sum of internal angles of a regular pentagon is equal to the value of the sum of internal angles of three triangles.
(2) There are same length two sides and same value two angles in an isosceles triangle.
(3) If two lines to be perpendicular to each other, the angle in between the two lines must be 90°.
(4) When draw concentric circles with different radiuses, the value of angles around the centre of circles are different from each other.

4.



Few sectional planes on a cone are shown as A-A, B-B, C-C and D-D. Which sectional plane shows a shape of an ellipse when cut across?

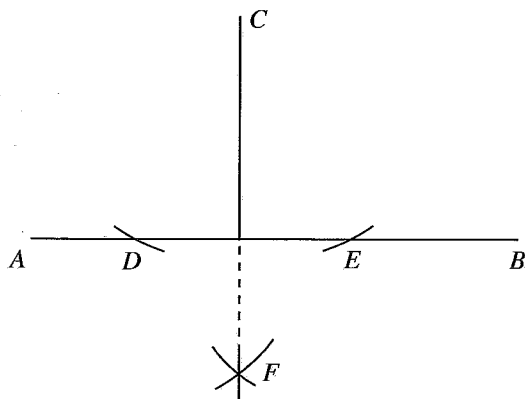
- (1) A-A (2) B-B (3) C-C (4) D-D

[see page two]

5. The correct geometrical constructions that can be drawn with a specified length or a specified radius by joining two points on a flat surface are

- (1) one straight line and one arc.
- (2) one straight line and two arcs.
- (3) two straight lines and one arc.
- (4) two straight lines and two arcs.

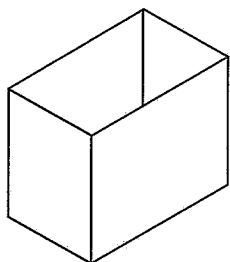
6.



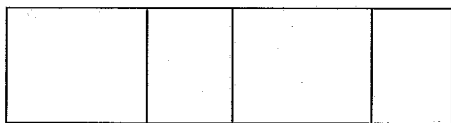
The geometrical construction shown in the above figure, is used

- (1) to draw a perpendicular to a straight line from an external point.
- (2) to bisect a straight line.
- (3) to bisect a straight line perpendicularly.
- (4) to divide a straight line in a ratio.

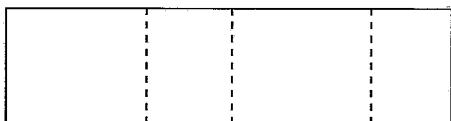
7. Which figure corresponds with the development of following hollow object?



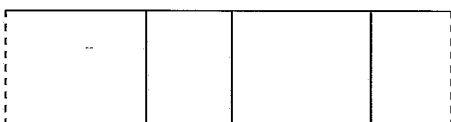
(1)



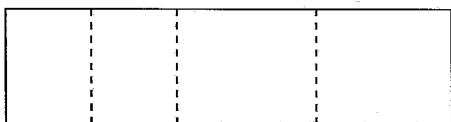
(2)



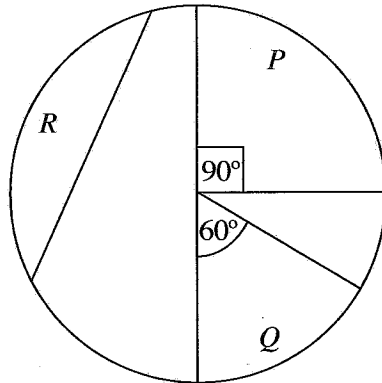
(3)



(4)



8. The below figure shows few parts of a circle as P , Q , R .

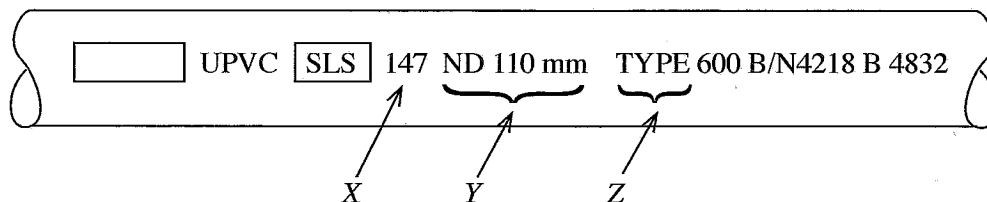


Which is the correct option that indicates the names of parts P , Q , R in order?

- (1) quadrant of a circle, concentric segment and segment of a circle
 - (2) quadrant of a circle, arc and segment of circle
 - (3) semi circle, quadrant of a circle, arc
 - (4) arc, quadrant of a circle, segment of a circle
9. The change in the original shape of a material due to stretch or compression is known as
- (1) brittleness. (2) deformation. (3) fusibility. (4) ductility.
10. Not a mechanical property of a material is
- (1) tension. (2) compression. (3) elasticity. (4) melting point.
11. The colour of a well burnt brick is
- (1) light yellow. (2) light purple. (3) reddish brown. (4) orange.
12. What is the timber defect occurred as a result of twisting of tree trunk due to the wind during the growth?
- (1) Buttresses (2) Sapwood (3) Knot (4) Cross grain
13. When placing concrete at a height, the maximum height that can place concrete without segregation is
- (1) 1.2 m. (2) 1.5 m. (3) 2.0 m. (4) 2.5 m.
14. What are the standard measurements of a burnt clay brick according to Sri Lanka standards?
- (1) 215 mm \times 102.5 mm \times 65 mm (2) 220 mm \times 105 mm \times 65 mm
 - (3) 225 mm \times 112.5 mm \times 65 mm (4) 230 mm \times 115 mm \times 65 mm
15. Select the option which include the most correct steps to follow when storing tools and equipment with rusty parts to maintain safety and durability after use.
- (1) Sharpening and storing (2) Cleaning and storing
 - (3) Lubricating and storing (4) Testing and storing
16. What is the choice that shows holding and bearing tools, equipment only?
- (1) Vice, mallet, hand pliers
 - (2) 'G' clamp, vice, hand pliers
 - (3) Vice, 'T' clamp, pop rivet machine
 - (4) Hand clamp, mallet, hand pliers
17. It is essential to sharpen the tools to complete a high quality task and also for the workability. What is the choice that includes sharpening tools only?
- (1) Sanding stone, Wheel grinder and Triangular file.
 - (2) Sanding stone, Double ended key and Claw hammer.
 - (3) Wheel grinder, Carborundum stone and Claw hammer.
 - (4) Wheel grinder, Double ended key and Oil stone.

18. A type of hinge use to fix heavy doors and gates is
 (1) Alternative strap hinges. (2) Pivot hinges.
 (3) Strip hinges. (4) Parliament hinges.
19. A tool used to check the horizontality and verticality of a brick wall
 (1) try square. (2) straight edge. (3) spirit level. (4) gauge rod.
20. The piece of brick gives by breaking a brick across the width of brick or header face is
 (1) queen closer. (2) brick bat. (3) king closer. (4) half brick bat.
21. The loads remain on a structure for a long time in stable manner are known as
 (1) live loads. (2) dead loads.
 (3) environmental loads. (4) wind loads.
22. What is the choice which contains methods of finishing brick walls only?
 (1) plastering, painting, varnishing
 (2) plastering, fixing aluminium cladding, painting
 (3) wall tiling, plaster and smoothing, enamel painting
 (4) fixing natural stones, fixing polished timber parts, floor tiling

23. The following figure shows a group of information printed on a UPVC pipe.



In order, X, Y, Z above shows

- (1) trade mark, nominal external diameter and manufacturing batch number.
 (2) trade mark, nominal external diameter and pressure group.
 (3) standard code, nominal external diameter and pressure group.
 (4) standard code, nominal external diameter and manufacturing batch number.
24. The component used to join two UPVC pipes with unequal diameters is
 (1) joining socket. (2) valve socket. (3) faucet socket. (4) reducing socket.
25. The tool used to mark 90° angle lines on a plained timber is
 (1) spirit level. (2) try square. (3) bradawl borer. (4) marking gauge.
26. What is the valve used to auto control the water flow to a water tank through a supply line?
 (1) Ball valve (2) Gate valve (3) Stop valve (4) Foot valve
27. Out of the following constructions what is the most ancient construction in Sri Lanka?
 (1) Lotus Tower.
 (2) Colombo port railway station.
 (3) Nine arched bridge.
 (4) Lowamahapaya.
28. The most accurate tool used to measure the diameter of a hole is
 (1) try square. (2) inside caliper. (3) measuring tape. (4) outside caliper.
29. The brittleness of a material is
 (1) bursting in to pieces on a hard blow.
 (2) ability to be drawn and bent without breaking.
 (3) the deformation of the original shape in tension or compression.
 (4) to be melted after receiving heat.

30. Out of the following constructions what is the most modern construction in Sri Lanka?
(1) Victoria dam. (2) Parakrama reservoir.
(3) Sigiriya fortress. (4) Dawatagaha mosque.
31. The fastener used to permanently close the first sash of a two sashes door is
(1) hinge. (2) bolt. (3) lock. (4) hasp and staple.
32. What is the tool used to remove the twist and to prepare width and thickness of a swan timber to approximate sizes?
(1) hand saw (2) tenon saw (3) plane (4) flat chisel
33. The type of timber joint used to resist stress and compression of drawers when opening and closing of wooden table is a drawer of
(1) scarf joint. (2) mitre joint.
(3) mortice tenon joint. (4) dovetail joint.
34. The horizontal distance between two vertical joints of two consecutive courses of a brick wall is
(1) horizontal joint. (2) lap.
(3) vertical joint. (4) bed joint.
35. The finishing method applied to finish wooden handle of 'Sesath', 'Muthukuda', 'Watapatha' is
(1) laminating. (2) lacquer work. (3) painting. (4) varnishing.
36. It is needed to fix a water tap in the middle of a pipe while laying water pipe system. The correct component that should be selected is
(1) Reducing tee socket. (2) Equal tee socket.
(3) Faucet tee socket. (4) Faucet socket.
37. The area of a plank with 200 mm wide and 5 m length is
(1) 1 m². (2) 2 m². (3) 3 m². (4) 4 m².
38. Below are the widths of two ends and the middle of a plank.
0.200 m, 0.250 m, 0.150 m
If the length of the plank is 4 m, the area is
(1) 0.4 m². (2) 0.6 m². (3) 0.8 m². (4) 1 m².
39. The device used to remove a wire nail with a damaged head is
(1) claw hammer. (2) screw driver. (3) pincer. (4) ball hammer.
40. An essential tool for making a dovetail joint is
(1) bevel square. (2) claw hammer. (3) auger. (4) bow saw.

**

<p>திரிலாங்ககரணச ஸா ஓடிக்கிரீதி ஸாந்த்ரணலேடிச</p> <p>வாடிவமைப்பும் நிருமாணத் தொழினுட்பவியலும்</p> <p>Design and Construction Technology</p>	<p>I, II</p> <p>I, II</p> <p>I, II</p>
--	--

* Answer **five** questions including the **first** question and **four** other selected questions.

* Question No.1 carries **20** marks and each of the other selected questions carry **10** marks each.

-
- The isometric view shows a mechanical part with the following dimensions and features:
- Overall Dimensions:**
 - Length (A): 85
 - Width (B): 50
 - Height (C): 35
 - Top Features:**
 - A rectangular cutout on the top surface with a width of 30 and a depth of 15.
 - A fillet with a radius of $R10$ transitions between the top surface and the vertical side of the cutout.
 - Side Features:**
 - A vertical step on the left side with a height of 20.
 - A vertical step on the right side with a height of 15.
 - Coordinate System:**
 - The C -axis points vertically downwards.
 - The A -axis points towards the bottom right.
 - The B -axis points towards the bottom left.

- (1) Front elevation by looking at arrow *A*,
- (2) Side elevation by looking at arrow *B*,
- (3) Plan by looking at arrow *C*.

- (ii) Construct a tangent to a circle with 30 mm radius from an external point of 90 mm distance to the center of circle.

2. Concrete is a mixture of materials commonly used in construction industry.
 - (i) Name the materials, required to prepare a concrete mixture.
 - (ii) Write in order, the steps of preparing process of a concrete mixture.
 - (iii) State, which of the quality of concrete is measured by conducting slump test and state the measurements of standard slump cone.
3. Specific tools and equipment are used for each of the tasks in construction industry. It is necessary to take into consideration the personal safety while working with tools and equipment.
 - (i) Name, **four** fixing and striking tools and equipment.
 - (ii) State, **two** advantages of lubricating of power tools, and machine parts.
 - (iii) Describe in brief, the safety precautions that are to be applied when perform tasks using machines.
4. Different designs in the construction sector are created based on the human needs.
 - (i) Explain in brief what is a structure.
 - (ii) Name **three** fundamental characteristics of a structure.
 - (iii) Write, an example for each **one** of load bearing walls and non load bearing walls which used in housing construction.
5. The timber joint used to produce a timber product and finishing of the products are essential to maintain the quality of a timber product.
 - (i) Name and draw, **two** timber joints that can be used to join the legs of kitchen bench to the seat.
 - (ii) State, **four** advantages of finishing of kitchen bench.
 - (iii) Prepare, a list of equipment and materials need to paint kitchen bench using enamel paints.
6. The hinges are used to fix door sashes and window casements.
 - (i) Name, **two** types of hinges which can be used to fix a window casement to window frame.
 - (ii) Draw diagrams of hinges named above (i).
 - (iii) Explain the fixing method of a window casement to a window frame, including tools and equipment that are to be used.
7. It is proposed to construct a brick wall with the sizes of 1.5 m × 1.5 m (length×height) in stretcher bond which is to be used as a name board of a playground.
 - Number of bricks required for 1 m² brick wall to be constructed in stretcher bond is 60.
 - Price of a brick Rs. 55.00
 - Allow 5% for wastages of bricks, during transportation and usage
 - Cost of materials for required mortar including the mixing cost is Rs. 1500.00
 - Mason's cost for the construction of wall is Rs. 2000.00
 - Essential additional expenses, Rs. 500.00

Calculate the total cost required to construct the wall.